

CLAIMS

Claims 1 – 10 (canceled).

Claim 11 (original): A method for manufacturing hydrogen cyanide, acrylonitrile, and acetonitrile, the method comprising:

- providing at least one pulsed corona discharge reactor, each pulsed corona discharge reactor having a reaction zone;
- positioning a catalyst in the reaction zone;
- introducing at least one reactant feed stream containing hydrogen into the pulsed corona discharge reactor and contacting the catalyst; and
- removing hydrogen from the reactant to form hydrogen cyanide, acrylonitrile, and acetonitrile.

Claim 12 (original): The method of claim 11 and further comprising:

- constructing the walls of the pulsed corona discharge reactor has walls from membrane materials suitable for the selective continuous removal of hydrogen formed from the decomposition of the ammonia and hydrocarbon(s) in the reaction zone wherein the continuous removal of hydrogen from the reaction zone drives the reaction to completion.

Claim 13 (original): The method of claim 11 and further comprising:

- introducing an additive selected from the group consisting of air, oxygen and other combinations of nitrogen and oxygen into the reactant feed stream.

Claim 14 (original): The method of claim 11 and further comprising:

- adding ammonia and hydrocarbons into the reactant feed streams.

Claim 15 (original): The method of claim 14 wherein the hydrocarbons include methane, ethane, propane, propylene, and ethylene.

Claim 16 (original): The method of claim 11 and further comprising:
increasing the density of ions in the reaction zone with inert gases added to the reaction zone.

Claim 17 (original): The method of claim 11 and further comprising:
operating the pulsed corona discharge reactor on continuous/intermittent removal of products from the reaction zone.

Claim 18 (original): The method of claim 11 and wherein the reactants are hydrocarbon and ammonia, a solid phase catalyst is positioned within the reaction zone, and air, oxygen, and/or nitrogen are added to the feed stream.